

REMARKS

Claim 26 has been added. Claims 1-26 are pending.

Claims 14-25 were withdrawn as the result of a restriction requirement.

Drawings

The Office action objected to the drawings because they do not include the following reference signs: 116 of FIG. 8, and 126 of FIG. 6.

Reference sign "116" refers to a core glass layer (FIG. 4), from which a waveguide core 118 and alignment taper templates 119 (FIG. 5) are formed. With respect to FIG. 8, the specification explains the portion of the core glass layer that defines the alignment tapers is removed from the front part of the structure to reveal the remaining etch stop layer 114. Therefore, including the reference sign "116" in FIG. 8 would likely cause confusion. Instead, the specification has been amended in the paragraph beginning at page 9, line 15, to delete the reference sign "116."

The reference sign "126" refers to solder stripes (*see, e.g.*, FIGS. 11 and 15), which are not shown in FIG. 6. Therefore, adding the reference sign "126" to FIG. 6 would cause confusion.

In view of the foregoing remarks, applicant respectfully requests withdrawal of the objections to the drawings.

Claims

Applicant thanks the Examiner for recognizing that claims 8 and 9 include allowable subject matter. Those claims have been rewritten in independent form and should be in condition for allowance.

The remaining claims were rejected as follows:

- (1) Claims 1-7 were rejected as anticipated by U.S. Patent No. 4,728,193 (Bartelt et al.).
- (2) Claim 10 was rejected as unpatentable over the Bartelt et al. patent in view of U.S. Patent No. 5,343,292 (Brueck et al.).
- (3) Claim 11 was rejected as unpatentable over the Bartelt et al. patent.
- (4) Claim 12 was rejected as unpatentable over the Bartelt et al. patent in view of U.S. Patent No. 6,610,446 (Lercel).
- (5) Claim 13 was rejected as unpatentable over the Bartelt et al. patent in view of U.S. Patent No. 4,578,590 (Wu).

Independent claim 1 has been amended to recite that the detected optical signal is based on light transmitted through the first and second patterns of marks. Support for the amendment may be found, for example, in FIG. 13 and at page 6, lines 7-9 and page 14, lines 14-17.

Thus, claim 1 recites a method that includes directing light onto components of an optical assembly in which a first component includes a first pattern of marks with a first frequency and a second component includes a second pattern of marks with a second different frequency. An optical signal based on light transmitted through the first and second patterns of marks is detected. The detected optical signal corresponds to a superposition of the first and second patterns. The method includes determining whether the first and second components are properly positioned with respect to one another based on the detected optical signal.

In contrast, the Bartelt et al. patent discloses an alignment system in which light from a laser 32 is directed toward substrate and mask gratings 10, 12, which diffract light signals toward a recombiner 38 where the diffracted signals are recombined before detection by a detector array 40. (*See* FIG. 3.)

The Brueck et al. patent discloses techniques for alignment of lithographic features. Although light from the source 27 passes through a reticle grating 31, the light then is reflected or refracted by a second grating 39 on a semiconductor wafer 41.

Therefore, neither the Bartelt et al. or Brueck et al. patents disclose or suggest that the detected optical signal is based on light “*transmitted through [] first and second patterns of marks*” as recited in pending claim 1. The other cited references also do not disclose or suggest the subject matter of claim 1 or dependent claims 2-13.

The dependent claims include additional features that make those claims independently patentable. For example, claim 4 recites directing light onto a reference pattern of marks “in one of the components,” where the reference pattern corresponds to a superposition of the first and second patterns. Thus, according to claim 4, the reference pattern is either in the first component that includes the first pattern or in the second component that includes the second pattern. An example is shown in FIG. 16 in which a reference pattern 106 is in the waveguide circuit substrate and a superposition of the first and second patterns.

The Bartelt et al. patent discloses use of a calibration pattern (col. 11, lines 56-65) for providing the reference data in step 52. However, there is no suggestion that such a calibration pattern is in either the substrate or mask on which the gratings are formed.

Claim 4 should be allowed for that additional reason as well.

Independent claim 26 is based on original claim 1, and recites that the light from the light source impinges the first and second components in a direction substantially perpendicular to the patterns of marks. An example is illustrated in FIG. 13.

In contrast, according to the Bartelt et al. patent, the laser source 32 is “positioned at an angle to a perpendicular axis extending normal to the mask and substrate.” (Col. 6, lines 22-25; *see also* FIG. 3) The Bartelt et al. patent explains that positioning the laser at such an angle permits the alignment system to work without interfering with the lithography energy beam during exposure of the wafer substrate (col. 2, lines 40-43).

Although the Brueck et al. patent discloses that the source 27 is substantially perpendicular to the grating 31, the light does not impinge the second grating 41 in a direction a substantially perpendicular to the grating. (*See* FIG. 3.)

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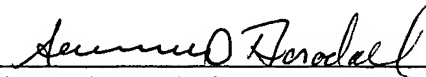
The other references also do not disclose or suggest the subject matter of claim 26.

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

Enclosed is a check for excess claim fees and a check for the Petition for Extension of Time fee. Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

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